XXX. *Description of* Peachia hastata, *a new genus and species of the Class* Zoophyta; *with observations on the Family* Actiniadæ. *By* Philip Henry Gosse, *Esq.*, *A.L.S.*

Read March 20, 1855.

In the month of January 1854, and afterwards in March of the same year, the Rev. Charles Kingsley found, in the vicinity of Torquay, many specimens of an *Actinia*, which he kindly forwarded to me. As it appeared not only to be an undescribed species, but to have characters which separate it generically from others, I venture to lay before the Linnean Society my observations concerning it.

The body (Tab. XXVIII. fig. 1) is spindle-shaped or clavate, 4 inches in length, and 1 inch in greatest diameter, pellucid, very pale red, with numerous slender whitish lines, running at equal distances down the whole length. These do not vary in width, and are evidently the edges of the internal septa, seen through the translucent integument. The red colour is dependent on a thin epidermis, which, as the animal is apt, when in a sickly state, to distend itself greatly in parts, bursts, and separates into torn shreds, displaying the pellucid body beneath.

The oval disk is very protrusile; it is surrounded by a single circle of twelve (eleven in one specimen) tentacles. These are short, thick at the base, tapering to a point; and are frequently carried recurved over the margin, like rams' horns (fig. 2). Their markings are peculiarly elegant. Each tentaculum is pellucid-white, as to its ground colour; but its upper side, or that which faces the disk, is variegated with arrow-heads of white and brown, in two parallel lines (fig. 3). The arrows point towards the base of the tentacle, and the colours are arranged alternately, one of white with one of brown fitting into its angle, and so on: there are about six of white and six of brown in each of the two rows; but towards the extremities they have a tendency to become confluent.

The disk is somewhat similarly marked with arrows or vandykes; but they point in the opposite direction towards the circumference. The arrows of the outermost circle are strongly marked, and form a star or flower of twelve points, of deep brown; of which the points diverge again, to embrace partially the bases of the several tentacles. Within this circle there is a similar one of white, and within this, another of small brown arrows, which are not united.

The mouth is very evertile, but does not rise into a cone. Its lips are grooved interiorly, and the grooves are deep brown, and appear to be confluent at some distance down the throat. From the mouth protrudes a singular organ, to which I know of no parallel in this class of animals. It is a sort of fleshy proboscis, the tip of which dilates into a clubbed head, divided into short papillæ (figs. 2 *a* and 4 *a*). The papillæ were about twenty in number in my largest specimen, with a tendency to form groups, slightly radiating; each papilla consisting of a pellucid sheath and of a dark brown core.

This curious apparatus appeared to form one side of the mouth,—to be, in fact, an enlargement of the paries or lip, at one part of the circumference, with nothing corresponding to it on the opposite side. It was perforate, and, as I conjecture, led down to the visceral cavity of the body, external to the stomach, constituting the orifice through which the ova or young are ordinarily deposited. In the smallest specimen I could not detect more than four or five of the cored papillæ on this prominence. Under a lens, when the animal was sickening, and the lips were much protruded and everted, the organ was evidently seen to be a tube, with thickened walls, enclosed within one paries of the œsophagus, and with its margin studded with papillæ. Into the orifice, which was corrugated, I could thrust a bristle with ease. Fig. 5 represents the mouth in this condition.

The natural habits of this Zoophyte, as seen in freedom, are thus graphically described by Mr. Kingsley in his letters to me. "They lie (or rather stand) in wet, ribbed, clean sand, at low-water mark, the disk just out of ground. On digging carefully (for the animal retracts on the least shaking of the sand), you find that he is buried bolt-upright to the depth of 9 inches, where his extremity stops; the whole animal tapering gradually from stem to stern. On being taken out (no easy matter, since its power of retraction, if irritated, is far more rapid and springy than in any of the class, as far as I have tried them), and put into a vase of salt water, he swells himself out with water like a Holothurian, disclosing longitudinal septa. He also has a tendency to transverse constriction, like *Scolanthus* and *Chirodota*; but this has gone off in my specimens. All his motions (at least before he has made a cold bath of his own skin by taking in water) are rapid and spasmodic; betokening, as does his whole make, a higher muscular organization than that of the *Actiniæ*."

None of the specimens made the slightest attempt to adhere; nor did the posterior extremities show any appearance of a sucking disk. There was, however, a strong corrugation in that part, radiating from a central orifice, into which I thrust the point of a pin without resistance to the depth of $\frac{1}{8}$th of an inch.

All the three specimens which first came into my hands were more or less languid and sickly when I received them. One of them was swollen into a balloon-like form, and never expanded the tentacles at all. The others soon became invested with a thick tenacious mucus, and though they retained the power of expanding and retracting the tentacles, they burst the integument in one or more wounds, so that the convoluted bands protruded. The latter organs were present in copious profusion, broad bands very much frilled, with a slender "beading" or thickened border, which the microscope showed to be moderately filled with minute slender thread-capsules, about $\frac{1}{900}$th of an inch in length, slightly curved; they discharged the thread freely, but with unusual slowness, the lengthening of the tip resembling the progress of the minute-hand of a watch. One that I measured, of an average length, extended to about $\frac{1}{50}$th of an inch, or eighteen times the length of the capsule.

All these individuals successively became defunct by a sort of spontaneous dissolution of the parietes of the body. The integument seemed to change into a viscid mucus, and presently burst in many places, allowing the convoluted bands to protrude so copiously

as to conceal and envelope the body. As this protrusion proceeded, I found that these bands were not the ovaries, as I at first supposed, but were attached to them. The ovaries were protruded also in the form of thick tubes, much convoluted, and of a salmon-colour, studded with minute white specks. These tubes were filled to distension with their contents, and were consequently plump, at least at one edge; for, as well as I could judge, they ran off at the opposite edge into a broad, exceedingly attenuated, gelatinous ribbon. Along the thickened and tubular edge was attached the capsuliferous band, as a mesentery; this also having a thickened margin, but differing in structure, as well as in appearance from the former. It was narrower and much more convolved; the edge lying in pretty regular figure-of-8 turns, or scrolls, like the frill of a cap; the colour of this band was dull yellowish, with the thickened border white. This border was, as I have said above, principally composed of thread-capsules; but in the salmon-red tubes I found none of these organs. They were filled with ova, enveloped in a red mucus, which gave the colour not only to the tubes themselves, but also to the body of the animal. These ova were globose or pear-shaped bodies, very soft and elastic, the largest measuring $\frac{1}{65}$th of an inch in length, by $\frac{1}{100}$th in diameter; while others (of the globose form) probably less advanced, were not more than $\frac{1}{175}$th of an inch in diameter. Indeed they rather resembled the planules of a *Plumularia* or *Antennularia* than proper ova, except that they had no motion, and were not ciliated. They consisted of a granular brown substance, becoming clear and colourless at the circumference. I could see no trace of a nucleus in any, either with or without pressure.

The animals, so burst and apparently dead, I allowed to remain in a dish of pure sea-water, with a growing leaf of *Ulva*, to preserve its vitality. To my surprise, they at length were evidently everted, *turned* (by the continuance of the process of protrusion through the ruptured integument) *completely inside out*, so that the membranous septa of the interior now projected from the circumference; while from each interseptal space protruded the convoluted ovaries, with their mesenteries and frilled bands. Nor did it appear that death had really ensued. As an animal, an individual, I could not consider it otherwise than deceased; for it was become a shapeless mass of viscera, from which the original integuments were sloughing, in films of glairy membrane. But no putrescence had set in; and on examination with a lens, through the sides of a glass vase, to which I had early removed the specimens, I found in each one, twelve days after they had been in this dissolved state, that the ovaries maintained a perfectly clear, plump, healthy appearance (fig. 6), with a more vivid rose-tint than at first; and that the frilled bands were slowly, but constantly, moving all over them; puckering and unfolding their involutions, and altering their forms, by means of the cilia with which they were covered; —a beautiful provision for the respiration, so to speak, of the yet undeveloped embryos, by the perpetual passage of currents of the surrounding water along the ovaries.

I was thus forcibly reminded of the mode in which the oviposition is effected in that little lovely Medusa, *Turris neglecta*,—by the protrusion of the ovary, and the eversion and gradual dissolution of the umbrella, as I have elsewhere described and figured*; a process, which I have now reason to believe is common to the higher kinds, at least, of

* Devonshire Coast, p. 352.

the Pulmograde Medusæ, since I have observed it in several of the Covered-eyed genera. The affinity between the Arachnoderm and Actinoderm classes of RADIATA was already known to be close; and these curious facts may add another link to the connexion.

If the rupture and inversion of the body in this instance was a normal process, it still would not be inconsistent with the function which I assign (from analogy with other *Actiniadæ*) to the curious papillated duct at the side of the mouth. Ova or living young may be discharged through this orifice, at intervals, during life, and yet the most prolific birth may be reserved for the period of the parent's decease, when the whole contents of the ovaries are committed to the waves.

Whether it was so or not, however, I did not ascertain; for, about a week later, or eighteen days after the evolution, I perceived that the mucous integuments were decomposing and becoming offensive. The ovaries and their bands wore nearly the same appearance as before; but some of the former were dispersing in flocculent shreds, in which I could not detect any embryos more advanced than those which I had before examined. The frilled bands maintained spontaneous motion, but very slow. I therefore took the specimen from the vase and examined it. I found it completely inverted; the tentacles were set around the interior of one extremity, and the papillated orifice at the edge of the mouth was very distinctly seen. The papillæ are arranged around the orifice in flat hand-like eminences, each containing three or four papillæ, resembling fingers. The dark-brown cores, so well-defined that they look like solid bodies, under pressure appear to consist of pigment-cells or granules, of similar consistence to that of the surrounding flesh.

The anal extremity was much more distinct than before; the orifice being $\frac{1}{8}$th of an inch in diameter, and perfectly defined, with striæ radiating from its margin, and the thickened septa commencing in a circle around it.

No sac-like fundus was visible to the stomach, but it seemed to merge into the visceral cavity, as described by M. Hollard (Ann. des Sci. Nat. 1851), and by Dr. Cobbold (Ann. Nat. Hist. 1853); differing only in the fact just mentioned, *that this cavity had a posterior orifice.*

The possession of an excretory orifice to the body is a character of sufficient importance to separate this species from the genus *Actinia.* I therefore propose to constitute a genus for it, by the name of *Peachia*, as a tribute to the zeal, industry, and success with which marine zoology has been studied by Mr. Charles W. Peach. I am influenced in this selection of a name, also, by the circumstance that a species discovered by that gentleman in Cornwall, and named by him *Actinia chrysanthellum*, appears to resemble the present species closely, and may prove to belong to the same genus. It is very minute, whereas this is a zoophyte of large dimensions; and the describer has not mentioned the existence of a posterior orifice, nor of any papillated structure in front. The former may, however, have been overlooked.

The genus and species may be thus characterized:—

PEACHIA, *Gosse.*

Corpus elongatum, subcylindricum, pyriforme, v. fusiforme, ditrematum, liberum; *tenta-*

culis paucis, brevibus (disci diametrum haud superantibus), crassis, conicis, uniseriatis; *oviductu* in tuberculum papillosum desinente.

1. PEACHIA HASTATA (*Gosse*), corpore roseo lineis æqualibus pallidis, tentaculis 12 albo-hyalinis seriebus 2 parallelis maculârum sagittatarum brunnearum notatis, disco circulis duobus maculârum brunnearum **V**-formium cincto, oviductûs papillis numerosis aggregatis.

2?. PEACHIA? CHRYSANTHELLUM, corpore cylindrico albido lineis inæqualiter latis, tentaculis brunneo annulatis.

Actinia chrysanthellum, Peach.

The principal interest of this form is the decided approach which it makes to a higher type of existence than that of the ACTINODERMATA. The sensitiveness to alarm, and the spring-like rapidity of its motions, indicate a greater condensation in the nervous and muscular systems; but the existence of a posterior opening to the digestive canal is a still more decisive advance in structural rank. The approach to the ECHINODERMATA, through the *Sipunculidæ*, is marked, not only by this important character, but also by form, by the degeneration of the tentacles in number and dimensions, and by the tendency to break up the body by spontaneous constriction.

The genus *Edwardsia* of M. Quatrefages, still further diminishes the interval between the *Actiniæ* and the *Holothuriæ*; for the mouth and tentacula are, in that genus, seated at the end of a delicate column, which is retractile within the coriaceous trunk, as it is in *Syrinx nudus*; and the balloon-like inflation at the posterior extremity reminds us of the same animal. It is curious to trace also, in *Syrinx* itself, an approach to the Actinoderm type, in the digestive canal terminating near the head, the greater portion of the body being imperforate.

I may observe, in passing, that the genus *Edwardsia* is represented by two British species. One was described and figured by myself in the "Annals of Natural History" for Sept. 1853, under the name of *Scolanthus callimorphus*; but, as I am now convinced that notwithstanding the apparently simple posterior extremity in that species, it must be referred to *Edwardsia*, the genus *Scolanthus* must be cancelled. The name will hence become *Edwardsia callimorpha*. Another species is described by Mr. Kingsley (*in litt.*), which appears to be *E. Beautempsii* of M. Quatrefages.

I will embrace this opportunity of making a few observations on the more typical *Actiniæ*. Restricted as is the genus *Actinia*, by the separation from it of *Adamsia* and *Anthea* among British, of *Metridium* and *Actinecta*, and many others among exotic species, and by the creation of such genera as *Capnea*, *Corynactis*, *Ilyanthus*, &c., it is still so immense a group, that any subdivision of it on sound principles is desirable, especially when we consider the great difficulty of defining species in this tribe. Indeed, I hold that, wherever we find *several* characters *co-existent* in a certain number of species, *none of which are common to other species*, the species possessing such characters ought to be elevated to the rank of a separate genus.

Applying these principles to the group before us, I find a number of *Actiniæ*, which

have the well-marked character of projecting, from pores in the exterior of the body, whenever they are irritated, thread-like filaments, in great abundance and to great length, which are again withdrawn into the body. These filaments, when examined with a high power, are seen to be chiefly composed of thread-capsules, or "nettling-organs;" and I have given elsewhere* evidence to show that their function is that of efficient weapons of offence, paralysing even vertebrate animals, with which they are brought into contact. Every one who has handled *A. parasitica*, *venusta*, or any of the species with missile threads, is aware of the great tenacity with which these filaments adhere to the fingers. This is owing to the penetration of the epidermis by the myriads of ejected threads, and to the hold which their barbed structure enables them to retain. For when these nettling organs are examined, say with a power of 500 diameters, the thread is perceived to be armed in a manner which gives them a superiority over those of all the non-shooting species; and thus the structure of these organs affords us another excellent and constant generic character. There are, indeed, in these species, always to be found many thread-capsules of the *ordinary* form and structure, viz. linear-oblong, emitting a thread which is apparently simple, and of great length, extending to about twenty times the length of the capsule. But the principal portion of the capsules are of another form, being long-oval with a distinct longitudinal chamber, and emitting a thread, never exceeding thrice the length of the capsule, and more commonly one or one and a-half times, as in *A. Bellis* (fig. 10), and in *A. Troglodytes* (fig. 11). The terminal portion of this thread (including from half to more than three-fourths of its length, according to the species) is barbed with close-set bristles radiating on all sides like the hairs of a bottle-brush, and more or less reverted. In *A. venusta* (fig. 7), a zigzag lineation is discernible on the thread, which seems to indicate that the hairs are set on in a spiral arrangement. Before emission, the thread-chamber is very distinct in this species (fig. 8), running through the whole length of the capsule, slightly bent in a sigmoid curve, and gradually merging into the capsule-walls at the discharging end. In some instances the thread is discharged, in every respect agreeing with that just described, but perfectly simple and without barbs (fig. 9): I think that this occurs when the emission has been very slow; that the barbed hairs fly out only when the missile force is sudden; that, otherwise, they continue appressed to the sides, and invisible. I can discover no trace of the spiral in the un-emitted thread.

This brush-like form of the nettling-thread I find in ten of our native species of *Actinia* (which I shall presently enumerate), invariably co-existent with the power of emitting filaments spontaneously. They are marked also by other characters, of less importance because less definite:—the tentacles are generally of small size, slender, numerous, and much crowded; the body is soft, rarely coriaceous, and smooth, though commonly perforated with sucking glands, which are distinct from the emitting pores; and the colours of the body often have a tendency to run in longitudinal bands, and those of the tentacles to form arrow-heads. The genus thus characterized I propose to call *Sagartia*†.

The remaining British species (for I beg it to be observed that I am speaking only of

* 'Devonshire Coast,' *passim*; 'Aquarium,' pp. 115, 143, 148.

† "There is a certain nomadic race called Sagartians. . . . The mode of fighting of these men is as follows:—

such as I have had opportunities of personally examining) may be distributed into two groups. The first contains such species as have the body studded with warts; the skin coriaccous; the tentacles moderately few, generally thick, conical, and obtuse, and for the most part marked on their facial surface with transverse dashes of opaque colour. They do not discharge filaments under any annoyance (when wounded, however, the convoluted ovarian bands protrude); and the nettling threads of their tissues are long and simple, or at least never brush-like. That of *A. crassicornis*, indeed, is armed at its base, as I have represented it elsewhere*; but it is in a manner peculiar to itself, and totally unlike that of the *Sagartiæ*. This fine species deviates, in some other subordinate particulars, from the rest of the verrucose *Actiniæ*, and may possibly require ultimately to be separated. For the present, however, I include it in this genus, which I propose to call *Bunodes*†.

There now remains a group, for which, as it includes the most abundant of our species, the everywhere-familiar Smooth Anemone (*A. Mesembryanthemum*), I would retain the appellation of *Actinia*. In addition to this well-known species we have two others on the British shores, which I shall presently mention. Besides the negative characters which mark these species—the absence of emitted filaments, and of surface-warts,—they have a distinct positive one, in the existence of a series of spherical or oval bodies, of unknown function, seated between the outermost row of tentacles and the margin of the disk. In our native species these are conspicuous, from their opaque blue or white colour; but in exotic species, they occur of other hues. In *Mesembryanthemum*, the ovarium-bands, and the walls of the tentacles, are furnished with comparatively few thread-capsules, which are linear, and very small; those of the bands being about $\frac{1}{700}$th of an inch in length, and those of the tentacle-walls not more than $\frac{1}{1200}$th; whereas the ovate capsules of the *Sagartiæ* run from $\frac{1}{350}$th (*Dianthus*) to $\frac{1}{875}$th (*parasitica*); the length in most of the species being about $\frac{1}{500}$th.

The marginal spherules, however, are almost wholly composed of capsules, very linear, and about $\frac{1}{390}$th of an inch long. They very reluctantly emit the thread, which I have therefore seen only in few instances. It is very subtile, and of considerable length; but I was not able in any case to trace it to its termination. From these facts I incline to think, *that the marginal spherules of Actinia may represent, in function, the missile filaments of Sagartia* ‡.

Among subordinate characters of this genus may be mentioned the very delicate and smooth skin, destitute of both pores and sucking glands. The disk and tentacles are

when they engage with the enemy, they throw out ropes, which have nooses at the end; and whatever any one catches, whether horse or man, he drags towards himself; and they that are entangled in the coils are put to death."—Herodotus, vii. 85.

* 'Devonshire Coast,' pl. xxviii. fig. 19.

† Βουνώδης, *verrucosus, clivosus.*

‡ M. Hollard cannot conjecture the function of these marginal spherules. "Their position at the circumference, the volume and great transparency of their capsules, their existence in a species eminently littoral, exposed, and very sensible to the variations of the atmosphere, when the sea is out,—do not these circumstances indicate some physiological relation between these little organs and the action of light?"—(Ann. des Sci. Nat. 1851, p. 272.)

Has not M. Hollard, however, overlooked the fact, that the spherules *are never exposed to the atmosphere*, since the disk is expanded *only under water*?

unicolorous; as is also the body generally, though this is sometimes varied by lines or spots of another colour, which are by no means constant; a line of different hue more commonly encircles the base. The tentacles are moderately numerous, of medium thickness, tapering to a point.

These three genera may be therefore defined thus:—

1. Sagartia, *Gosse.*—*Actiniæ* basi adhærentes; *tentaculis* conicis, facilè retractilibus; *sphærulis* marginalibus nullis; *corpus* everrucosum, *filamenta capsulifera* e poris emittens; *filis urticantibus* brevibus, pilorum fasciculo densè armatis.

British species, *viduata* (=*anguicoma*, Price), *Troglodytes*, *Aurora*, *candida*, *rosea*, *nivea*, *venusta*, *parasitica*, *Bellis*, *Dianthus*. Probably also *aurantiaca* and *pulcherrima* of Professor Jordan. The following exotic species, figured by Dana in the Zoophytes of the American Exploring Expedition, seem to be referable to this genus:—*Primula*, the beautiful *decorata*, and *Fuegensis*, both allied to our *Bellis*; and *Achates*, *reticulata*, and *Paumotensis* (perhaps the most magnificent of the whole tribe), which are evidently allied to *Dianthus*.

2. Bunodes, *Gosse.*—*Actiniæ* sphærulis marginalibus nullis. *Corpus* verrucosum; *cute* coriaceâ, *filamentis* missilibus nullis; *filis urticantibus* longis simplicibus; *tentaculis* plerumque crassis, conicis, obtusis.

British species, *gemmacea*, *thallia*, *clavata*, *crassicornis*, *Monile* (probably the young of *crassicornis*)?, *Chrysoplenium*?, *alba*?, *miniata*? Of exotic species, *Diadema*, *pluvia*, *Gemma*, *Artemisia*, of Dana's Zoophytes, probably come here.

3. Actinia, *Linn.*—*Sphærulæ capsuliferæ* ad disci marginem seriatæ. *Corpus* everrucosum, *poris filamentisque missilibus* destitutum; *cute* lævi.

British species, *Mesembryanthemum*, *margaritifera*, *Chiococca*. Exotic species, *Tabella* and *graminea* of Dana.

The following British species are of doubtful place;—*coccinea*, *intestinalis*, *biserialis*, *vermicularis*. The very curious *biserialis* of the late lamented Professor Forbes has a close parallel in the *Rhodora* of Dana; and these may perhaps form another genus, when more is known about them. *Intestinalis* and *vermicularis*, both from the Shetland seas, show, in their slender lengthened form, an approach to the free condition of *Peachia*, &c. The latter of these is a deep-water species (eighty fathoms); and, as Professor Forbes observes, looked when unattached "more like a planarian worm than an *Actinia*."

The following table exhibits one manner in which the British noncoralligenous *Actiniadæ* may be artificially distributed:—

Adherent ...	Tentacles gathered into groups					*Lucernaria.*
	Tentacles continuous.	Tentacles scarcely retractile.	Adhering base entire			*Anthea.*
			Adhering base annular			*Adamsia.*
		Tentacles readily retractile.	Tentacles capitate			*Corynactis.*
			Tentacles truncate			*Capnea.*
			Tentacles conical	emitting filaments		*Sagartia.*
				without filaments	warted	*Bunodes.*
					smooth ...	*Actinia.*

Non-adherent	Monotrematous	Anterior extremity normal	*Ilyanthus.*
		Anterior extremity forming a retractile column	*Edwardsia.*
	Ditrematous		*Peachia.*

If we take *Sagartia* as the typical genus, which its superior populousness, and the perfection of its armature entitle it to be considered, we may trace, as from a central point, some of the relations of the *Actiniadæ*, *inter se*, as well as with other forms.

Adamsia comes very close to *Sagartia*, possessing the power of emitting filaments in high perfection: probably the point of union between these genera will be *S. parasitica*; which, like *Adamsia palliata*, attaches itself to shells in which *Paguri* dwell; and which is pre-eminent in its genus for the abundance and the tenacity of its filaments. The passage from *Sagartia* to *Bunodes* is perhaps through *S. Dianthus* and *B. clavata*; the disk of the latter being very expansive, with the tentacles situated at its margin. *S. Bellis*, in its power of assuming a saucer-like form for its thin expanded disk, to which the narrow body serves as a foot-stalk, shows also a remote approach to *Lucernaria*, in which this figure is permanent.

Lucernaria exhibits a beautiful link of connexion between the Actinoderm and the Arachnoderm forms of RADIATA. The *Oceania turrita* has its umbrella produced into a long moveable spire, which looks exactly like a foot-stalk, by which it had been attached when in a polype condition; while in *Bougainvillæa* we get the numerous tentacula gathered into groups. The mobile, four-lobed mouth of *Lucernaria* closely resembles the peduncle of a Medusa.

There is a curious analogy (I fear it is nothing more) between *Lucernaria* and the genus *Floscularia* among the ROTIFERA: both are attached by a slender pedicel; both have a flower-like disk, jutting out into angles, which are beset with a multitude of filaments (tentacles in the one case, setiform cilia in the other) that radiate in all directions.

The tender and soft-bodied little *Sagartia candida* and *S. rosea* seem to lead off to *Corynactis Allmanni*, though the points of resemblance are rather general than special. But this latter genus passes into *Capnea*, by a remarkable species described by Mr. W. Thompson of Weymouth, in the Zoological Transactions for 1853, under the name of *Corynactis heterocera*, and which I had an opportunity of examining while alive. Professor Forbes has observed the close affinity of his *Capnea sanguinea* to the *Zoanthadæ*, and the transition which the latter exhibit to the creeping and budding Hydroid polypes is sufficiently apparent. *Corynactis*, in its capitate tentacles, shows also a relation to *Cyathus Smithii*, among the coralligenous ANTHOZOA; while the simply-conical form of these organs in *Balanophyllia regia* agrees with *Actinia*, &c.

The transition from *Sagartia* to *Actinia* proper, I do not know how to trace, except by characters common to the whole group. The soft-bodied species of the former genus, which do not possess sucking glands, as *candida*, *venusta* and *nivea*, are however certainly more closely allied to the smooth-skinned *A. Mesembryanthemum* than such coarse species as *S. Bellis*, *parasitica*, &c., and this is all I can say.

I think, however, that *Actinia* makes a decided approach to *Lucernaria*, in the capsuliferous spherules of the margin; for the oval appendages which are placed on the edge of the disk, in the latter genus, alternating with the groups of tentacles, are, I doubt not, consimilar in structure and function to those spherules.

The nearest alliance of *Anthea* is with *Actinia*; to which, in the texture of its skin, and the absence of warts, pores and glands, it presents a close resemblance. The received notion, that *Anthea* is incapable of entire retraction, I have elsewhere stated to be incorrect; and I have since had several opportunities of seeing it with the tentacles quite concealed, and the animal assuming the ordinary butter-like shape of an *Actinia*. A better character is the tendency which the tentacles have to form groups, like several trunks of a tree united close to the ground. In this respect there is perhaps an approximation to *Lucernaria*; remote, however, for the clusters thus formed are still in contiguity with each other; and the peculiarity cannot be discerned, except when the animal is in the state of widest expansion.

Finally, the species *viduata* appears to be the point at which the genus *Sagartia* leads off towards the ECHINODERMATA. Though, in an Aquarium, it remains attached for months together, yet, in freedom, its adhesion is evidently very slight. It comes on shore by hundreds, after a gale, on the Devonshire coast; and is frequently dredged on sandy mud, sometimes adhering to a small bivalve-shell, but more commonly free, with the posterior extremity contracted, so as to resemble a thick pedicel. It burrows in sand; and, in conformity with such a habit, it has the power of great elongation. A specimen which I have kept for the last six months, sometimes forms a slender column 5 inches in height. From this vermiform creature the transition is so brief to the free *Ilyanthus*, that we hardly need to seek a place for *intestinalis* and *vermicularis*; and from *Ilyanthus* to the genera *Peachia* and *Edwardsia*, of which I have spoken in the former part of this Memoir, and thence to the *Sipunculidæ*, the road is patent.

These relations I have attempted to display by a diagram; though I need scarcely say, that such a representation cannot adequately express the varied consanguinities and cross-alliances of the grand plan of Nature.

EXPLANATION OF THE PLATES.

TAB. XXVIII.

Fig. 1. *Peachia hastata*: natural size.
Fig. 2. The oval disk and tentacles; (*a*) the papillæ of the oviduct: (magn. 2 diameters).
Fig. 3. A tentacle (magn. 2 diameters).
Fig. 4. The disk, with the papillæ (*a*) projecting: (2 diameters).
Fig. 5. The mouth of another specimen, showing the orifice of the oviduct: (4 diameters).
Fig. 6. A portion of the ovaries, with the convoluted bands: (10 diameters).
Fig. 7. Thread-cell of *Sagartia venusta*, with the barbed thread emitted.
Fig. 8. Thread-cell of the same, before emission.
Fig. 9. The same, with the unbarbed thread.
Fig. 10. Thread-cell and thread of *S. Bellis*.
Fig. 11. Thread-cell and thread of *S. Troglodytes*.

N.B. All the thread-cells are magnified 560 diameters.

TAB. XXIX.

The Diagram above referred to.